CLAIMS:

1.   A communication controller for communication on at least
     one communication bus, each communication bus
5   transferring a data stream according to a communication
     protocol, the communication controller comprising a
     communication handler coupled to the at least one
     communication bus adapted to be programmable to perform
     transformations of the data stream.

10 2. The communication controller of claim 1, wherein the
       communication handler comprises a programmable decoder
       and/or encoder.

    3. The communication controller of claim 1, wherein the
       communication handler comprises at least one programmable
15   bit engine.

    4. The communication controller of claim 1, wherein the
       communication handler comprises a programmable bit
       receiver and/or a programmable bit transmitter.

    5. The communication controller of claim 1, wherein the
20   communication handler comprises a programmable pattern
       detector.

    6. The communication controller of claim 1, wherein the
       communication handler is adapted to be programmable to
       perform transformations of the data stream on bit-level.

25 7. The communication controller of claim 1, comprising a
       communication control unit for controlling the
       communication handler.

    8. The communication controller of claim 1, comprising a
       memory for storing instructions to perform
30   transformations of the data stream according to several
       communication protocols.

9. The communication controller of claim 1, comprising a
   debug unit.

10. The communication controller of claim 1, comprising a
    peripheral channel connection for rapid loading of
5   instructions to perform transformations of the data
    stream according to custom protocols.

11. A microcontroller unit comprising the communication
    controller of claim 1.

12. The microcontroller unit of claim 11, adapted to
10 communicate on several communication buses
    simultaneously, each communication bus transferring a
    data stream according to a respective communication
    protocol.

13. A method of using a communication controller for
15 communication on at least one communication bus, each
    communication bus transferring a data stream according to
    a communication protocol, the communication controller
    comprising a communication handler coupled to the at
    least one communication bus adapted to be programmable to
20 perform transformations of the data stream, the method
    comprising the steps of
    a. selecting a communication protocol;
    b. programming the communication handler with instructions
    to perform transformations of the data stream according
25 to the selected communication protocol;
    c. receiving electrical signals representing data of the
    data stream;
    d. transforming the electrical signals representing data
    of the stream by the communication handler according to
30 the programmed instructions.

14. The method of claim 13, further comprising the step of
    re-programming the communication handler with

instructions to enable it to perform transformations of the data stream according to a re-selected communication protocol which is different from the previously selected communication protocol.

5   15.The method of claim 13, further comprising the step of generating an electrical signal representing logical bits from a voltage signal having transitions between voltage levels received on the communication bus and/or sending a voltage signal having transitions between voltage levels

10   on the communication bus generated from an electrical signal representing logical bits, according to the communication protocol.

16.The method of claim 13, further comprising the step of decoding/encoding data of the data stream.

15   17.The method of claim 13, further comprising the step of detecting a predefined pattern in the data of the data stream.

18.The method of claim 13, further comprising the step of identifying and providing as parallel data a data field

20   of logical bits received serially on the communication bus and/or providing for sending serially on the communication bus groups of logical bits provided as parallel data.

19.The method of claim 18, further comprising the step of

25   identifying and providing a data frame representing a message from data fields of logical bits and/or identifying and providing fields of logical bits from a data frame representing a message.

20.The method of claim 13, carried out by a communication

30   controller within a microcontroller.